

**FUEL INJECTORS WITH INTEGRAL FIBER OPTIC PRESSURE  
SENSORS AND ASSOCIATED COMPENSATION  
AND STATUS MONITORING DEVICES**

**Abstract.**

Fuel injectors (10) for internal combustion engines are modified and equipped with fiber optic fuel pressure sensors (12) and fiber optic combustion pressure sensors (14). The combustion pressure sensors (14) are located in separate channels (26) formed in the fuel injectors with the lower portion (22) of the channels leading to the combustion chambers. Above the combustion pressure sensors (14) are fiber optic leads (24). In the preferred embodiments the sensors (46) are equipped with diaphragms (40) of novel shape (48) and employ multiple pairs of fibers (86, 88), temperature sensitive components (72, 74, 126) and novel compensation and status monitoring circuits (FIGs. 6, 9, 10, 14, 15, 18).